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Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 3-7, 9, 11, 12, 14, 15, 17-22, 24-26, 28, 30, 32, 35-38, 40-46, 48, 50, 51 and 54-56 were amended as follows:

3. (amended) An assembly according to claim 1 ~~or 2~~ wherein the tubular metallic structure has surface formations thereon which project radially outwardly into the anode layer.

4. (amended) An assembly according to ~~any one of claims~~ claim 1 ~~to 3~~ wherein the tubular metallic structure has concave formations on a radially outer surface thereof into which the anode layer extends.

5. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 in which the tubular metallic structure extends substantially the full length of the tubular passage.

6. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the tubular metallic structure has a wall thickness in the range of 20 to 200 mm.

7. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the tubular metallic structure comprises a spiral or mesh of thread.

9. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the tubular metallic structure comprises a support tube which is at least substantially rigid.

11. (amended) An assembly according to claim 9 or ~~claim 10~~ wherein the support tube is formed of nickel or nickel alloy.

12. (amended) An assembly according to claim 9 or claim 10 wherein the support tube comprises a substrate of heat resistant, heat conducting metal and a nickel or nickel alloy surface layer.

14. (amended) An assembly according to claim 12 ~~or claim 13~~ wherein the surface layer is a foil or is coated on the substrate.

15. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein a thermally conductive tube liner is provided in the passage for conducting heat therefrom.

17. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the anode layer material is extruded onto the tubular metallic structure of the anode-side current collector and cured.

18. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the anode layer is a nickel cermet and has a thickness in the range of about 50 to 500 mm.

19. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the material of the electrolyte layer is provided on the anode layer by a method selected from slurry coating or otherwise depositing the electrolyte layer on the anode layer, extrusion on to the anode layer and co-extrusion with the material of the anode layer.

20. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the electrolyte layer has a thickness of less than 70mm.

21. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the cathode layer has a thickness in the range of about 30 to 100mm.

22. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the cathode layer is discontinuous along the length of the assembly to provide a plurality of longitudinally spaced cathode portions.

24. (amended) An assembly according to claim 22 ~~or claim 23~~ wherein at least some of the longitudinally spaced cathode portions are electrically connected in series.

25. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the cathode layer is discontinuous around the assembly.

26. (amended) An assembly according to claim 24 ~~and claim 25~~ wherein the discontinuity around the assembly is provided by at least one longitudinally-extending gap in the cathode layer and wherein the series connection of said longitudinally spaced cathode portions is provided by a strip of electrically conductive material in said gap.

28. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the cathode-side current collector comprises a metallic layer of noble metal or noble metal alloy which is adapted to permit oxygen containing gas around the assembly to contact the cathode layer.

30. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the cathode-side current collector comprises at least one mesh deposited on the cathode layer.

32. (amended) An assembly according to ~~any one of the preceding claims~~ claim 1 wherein the cathode-side current collector has a thickness in the range of about 20 to 100mm.

35. (amended) An assembly according to claim 33 ~~or claim 34~~ wherein each cathode portion has a length along the assembly in the range of about 25 to 80 mm.

36. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 35~~ wherein the cathode layer has a thickness in the range of about 30 to 100mm.

37. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 36~~ wherein each cathode portion has a respective cathode-side current collector.

38. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 37~~ wherein at least some of the longitudinally spaced cathode portions are electrically connected in series.

40. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 39~~ wherein the cathode layer is discontinuous around the assembly.

41. (amended) An assembly according to ~~claim 40 when dependent from~~ claim 38 wherein ~~the~~ a discontinuity in the cathode layer around the assembly is provided by at least one longitudinally extending gap in the cathode layer and wherein the series connection of said longitudinally spaced cathode portions is provided by a strip of electrically conductive material in said gap.

42. (amended) An assembly according to ~~claim 40 or~~ claim 41 wherein two longitudinally extending gaps are provided in the cathode layer.

43. (amended) An assembly according to ~~claim 41 or~~ claim 42 wherein the two gaps are diametrically opposed to each other.

44. (amended) An assembly according to ~~any one of claims~~ claim 41 ~~to 43~~ wherein the at least one gap has a width in the range of about 2 to 10 mm.

45. (amended) An assembly according to claim 39 ~~or claim 41, or any claim dependent therefrom,~~ wherein the strip is formed of the same material as the cathode-side current collector.

46. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 45~~ wherein the cathode-side current collector comprises a metallic layer of noble metal or noble metal alloy

which is adapted to permit oxygen containing gas around the assembly to contact the cathode layer.

48. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 47~~ wherein the cathode-side current collector comprises at least one mesh deposited on the cathode layer.

50. (amended) An assembly according to ~~any one of claims~~ claim 33 ~~to 49~~ wherein the cathode-side current collector has a thickness in the range of about 20 to 100mm.

51. (amended) A fuel cell bundle comprising a plurality of tubular fuel cell assemblies according to ~~any one of the preceding claims~~ claim 1 each mechanically connected to one or more adjacent tubular fuel cell assemblies.

54. (amended) A bundle according to ~~any one of claims~~ claim 51 ~~to 53~~ wherein the mechanical connection is rigid.

55. (amended) A bundle according to ~~any one of claims~~ claim 51 ~~to 53~~ wherein the mechanical connection is flexible.

56. (amended) A bundle according to ~~any one of claims~~ claim 51 ~~to 55~~ wherein the mechanical connection also provides an electrical connection between the adjacent tubular fuel cell assemblies.

Claims 57 through 65 were added as follows:

57. A bundle according to claim 56 wherein the mechanical connection is by connector means formed of the material of the cathode-side current collectors.

58. An assembly according to claim 41 wherein the strip is formed of the same material as the cathode side current collector.

59. A fuel cell bundle comprising a plurality of tubular fuel cell assemblies according to claim 33 each mechanically connected to one or more adjacent tubular fuel cell assemblies.

60. A bundle according to claim 59 wherein the mechanical connection is continuous along at least part of the length of the tubular fuel cell assemblies.

61. A bundle according to claim 59 wherein the mechanical connection is intermittent along the length of the tubular fuel cell assemblies.

62. A bundle according to claim 59 wherein the mechanical connection is rigid.

63. A bundle according to claim 59 wherein the mechanical connection is flexible.

64. A bundle according to claim 59 wherein the mechanical connection also provides an electrical connection between the adjacent tubular fuel cell assemblies.

65. A bundle according to claim 64 wherein the mechanical connection is by connector means formed of the material of the cathode-side current collectors.

CLAIMS:

1. A tubular fuel cell assembly comprising an anode side defining a tubular passage for fuel gas, the anode side comprising an anode layer and an anode-side current collector in electrical contact with the anode layer, a solid oxide electrolyte layer on a radially outer surface of the anode layer, a cathode layer on a radially outer surface of the electrolyte layer, and a cathode-side current collector on the cathode layer, wherein the anode-side current collector comprises a tubular metallic structure which is adapted to permit fuel gas in the passage to contact the anode layer, at least the surface of the tubular metallic structure being formed of Ni or Ni alloy, and wherein the tubular metallic structure is at least partly embedded in the anode layer.

2. As assembly according to claim 1 wherein the tubular metallic structure is at least substantially completely embedded in the anode layer.

3. An assembly according to claim 1 wherein the tubular metallic structure has surface formations thereon which project radially outwardly into the anode layer.

4. An assembly according to claim 1 wherein the tubular metallic structure has concave formations on a radially outer surface thereof into which the anode layer extends.

5. An assembly according to claim 1 in which the tubular metallic structure extends substantially the full length of the tubular passage.

6. An assembly according to claim 1 wherein the tubular metallic structure has a wall thickness in the range of 20 to 200 mm.

7. An assembly according to claim 1 wherein the tubular metallic structure comprises a spiral or mesh of thread.

8. An assembly according to claim 7 wherein the thread is a nickel thread.

9. An assembly according to claim 1 wherein the tubular metallic structure comprises a support tube which is at least substantially rigid.

10. An assembly according to claim 9 wherein the support tube is selected from an expanded metal tube, a woven mesh tube and a perforated tube.

11. An assembly according to claim 9 or wherein the support tube is formed of nickel or nickel alloy.

12. An assembly according to claim 9 or claim 10 wherein the support tube comprises a substrate of heat resistant, heat conducting metal and a nickel or nickel alloy surface layer.

13. An assembly according to claim 12 wherein the substrate is steel.

14. An assembly according to claim 12 wherein the surface layer is a foil or is coated on the substrate.

15. An assembly according to claim 1 wherein a thermally conductive tube liner is provided in the passage for conducting heat therefrom.

16. An assembly according to claim 15 wherein the tube liner is tubular.

17. An assembly according to claim 1 wherein the anode layer material is extruded onto the tubular metallic structure of the anode-side current collector and cured.

18. An assembly according to claim 1 wherein the anode layer is a nickel cermet and has a thickness in the range of about 50 to 500 mm.

19. An assembly according to claim 1 wherein the material of the electrolyte layer is provided on the anode layer by a method selected from slurry coating or otherwise depositing the electrolyte layer on the anode layer, extrusion on to the anode layer and co-extrusion with the material of the anode layer.

20. An assembly according to claim 1 wherein the electrolyte layer has a thickness of less than 70mm.

21. An assembly according to claim 1 wherein the cathode layer has a thickness in the range of about 30 to 100mm.

22. An assembly according to claim 1 wherein the cathode layer is discontinuous along the length of the assembly to provide a plurality of longitudinally spaced cathode portions.

23. An assembly according to claim 22 wherein each cathode portion has a respective cathode-side current collector.

24. An assembly according to claim 22 wherein at least some of the longitudinally spaced cathode portions are electrically connected in series.

25. An assembly according to claim 1 wherein the cathode layer is discontinuous around the assembly.

26. An assembly according to claim 24 wherein the discontinuity around the assembly is provided by at least one longitudinally-extending gap in the cathode layer and wherein the series connection of said longitudinally spaced cathode portions is provided by a strip of electrically conductive material in said gap.

27. An assembly according to claim 26 wherein the strip is formed of the same material as the cathode-side current collector.

28. An assembly according to claim 1 wherein the cathode-side current collector comprises a metallic layer of noble metal or noble metal alloy which is adapted to permit oxygen containing gas around the assembly to contact the cathode layer.

29. An assembly according to claim 28 wherein the noble metal is silver.

30. An assembly according to claim 1 wherein the cathode-side current collector comprises at least one mesh deposited on the cathode layer.

31. An assembly according to claim 30 wherein the at least one mesh is screen-printed on the cathode layer.

32. An assembly according to claim 1 wherein the cathode-side current collector has a thickness in the range of about 20 to 100mm.

33. A tubular fuel cell assembly comprising an anode side defining a tubular passage for fuel gas, the anode side comprising an anode layer and an anode-side current collector in electrical contact with the anode layer, a solid oxide electrolyte layer on a radially outer surface of the anode layer, a cathode layer on a radially outer surface of the electrolyte layer, and a cathode-side current collector on the cathode layer, wherein the cathode layer is discontinuous along the length of the assembly to provide a plurality of longitudinally spaced cathode portions.

34. An assembly according to claim 33 wherein adjacent longitudinally spaced cathode portions are separated by a gap having a width in the range of about 2 to 10mm.

35. An assembly according to claim 33 wherein each cathode portion has a length along the assembly in the range of about 25 to 80 mm.

36. An assembly according to claim 33 wherein the cathode layer has a thickness in the range of about 30 to 100mm.

37. An assembly according to claim 33 wherein each cathode portion has a respective cathode-side current collector.

38. An assembly according to claim 33 wherein at least some of the longitudinally spaced cathode portions are electrically connected in series.

39. An assembly according to claim 38 wherein the series connection is by means of at least one strip of electrically conductive material deposited on and bridging said cathode portions.

40. An assembly according to claim 33 wherein the cathode layer is discontinuous around the assembly.

41. An assembly according to claim 38 wherein a discontinuity in the cathode layer around the assembly is provided by at least one longitudinally extending gap in the cathode layer and wherein the series connection of said longitudinally spaced cathode portions is provided by a strip of electrically conductive material in said gap.

42. An assembly according to claim 41 wherein two longitudinally extending gaps are provided in the cathode layer.

43. An assembly according to claim 42 wherein the two gaps are diametrically opposed to each other.

44. An assembly according to claim 41 wherein the at least one gap has a width in the range of about 2 to 10 mm.

45. An assembly according to claim 39wherein the strip is formed of the same material as the cathode-side current collector.

46. An assembly according to claim 33 wherein the cathode-side current collector comprises a metallic layer of noble metal or noble metal alloy which is adapted to permit oxygen containing gas around the assembly to contact the cathode layer.

47. An assembly according to claim 46 wherein the noble metal is silver.

48. An assembly according to claim 33 wherein the cathode-side current collector comprises at least one mesh deposited on the cathode layer.

49. An assembly according to claim 48 wherein the at least one mesh is screen-printed on the cathode layer.

50. An assembly according to claim 33 wherein the cathode-side current collector has a thickness in the range of about 20 to 100mm.

51. A fuel cell bundle comprising a plurality of tubular fuel cell assemblies according to claim 1 each mechanically connected to one or more adjacent tubular fuel cell assemblies.

52. A bundle according to claim 51 wherein the mechanical connection is continuous along at least part of the length of the tubular fuel cell assemblies.

53. A bundle according to claim 51 wherein the mechanical connection is intermittent along the length of the tubular fuel cell assemblies.

54. A bundle according to claim 51 wherein the mechanical connection is rigid.

55. A bundle according to claim 51 wherein the mechanical connection is flexible.

56. A bundle according to claim 51 wherein the mechanical connection also provides an electrical connection between the adjacent tubular fuel cell assemblies.

57. A bundle according to claim 56 wherein the mechanical connection is by connector means formed of the material of the cathode-side current collectors.

58. An assembly according to claim 41 wherein the strip is formed of the same material as the cathode side current collector.

59. A fuel cell bundle comprising a plurality of tubular fuel cell assemblies according to claim 33 each mechanically connected to one or more adjacent tubular fuel cell assemblies.

60. A bundle according to claim 59 wherein the mechanical connection is continuous along at least part of the length of the tubular fuel cell assemblies.

61. A bundle according to claim 59 wherein the mechanical connection is intermittent along the length of the tubular fuel cell assemblies.

62. A bundle according to claim 59 wherein the mechanical connection is rigid.

63. A bundle according to claim 59 wherein the mechanical connection is flexible.

64. A bundle according to claim 59 wherein the mechanical connection also provides an electrical connection between the adjacent tubular fuel cell assemblies.

65. A bundle according to claim 64wherein the mechanical connection is by connector means formed of the material of the cathode-side current collectors.